

Edge-promoting reconstruction of absorption and diffusivity in optical tomography - DTU Orbit (08/11/2017)

Edge-promoting reconstruction of absorption and diffusivity in optical tomography

In optical tomography a physical body is illuminated with near-infrared light and the resulting outward photon flux is measured at the object boundary. The goal is to reconstruct internal optical properties of the body, such as absorption and diffusivity. In this work, it is assumed that the imaged object is composed of an approximately homogeneous background with clearly distinguishable embedded inhomogeneities. An algorithm for finding the maximum a posteriori estimate for the absorption and diffusion coefficients is introduced assuming an edge-preferring prior and an additive Gaussian measurement noise model. The method is based on iteratively combining a lagged diffusivity step and a linearization of the measurement model of diffuse optical tomography with priorconditioned LSQR. The performance of the reconstruction technique is tested via three-dimensional numerical experiments with simulated data.

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